Genetic variation in wood density and mechanical properties of 23-year-old *Liquidambar styraciflua* from Madagascar

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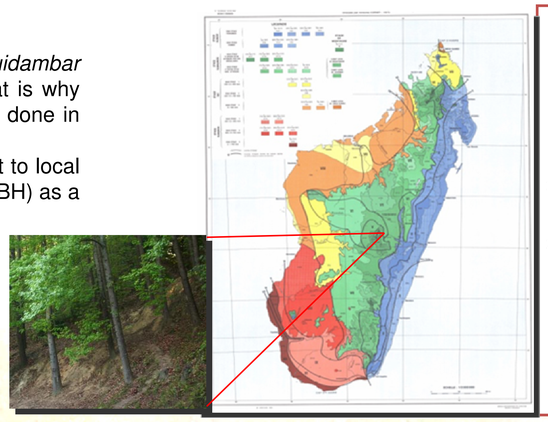
INTRODUCTION

Majority of 300000 ha artificial forests in Madagascar are composed of either Eucalyptus or Pinus species. A *Liquidambar styraciflua* provenance trial was established by DRFP/FOFIFA in 1986 in Mandraka. The species adapted well .That is why Malagasy organisms want to vulgarise this species. However, no study on wood properties of this species has been done in Madagascar.

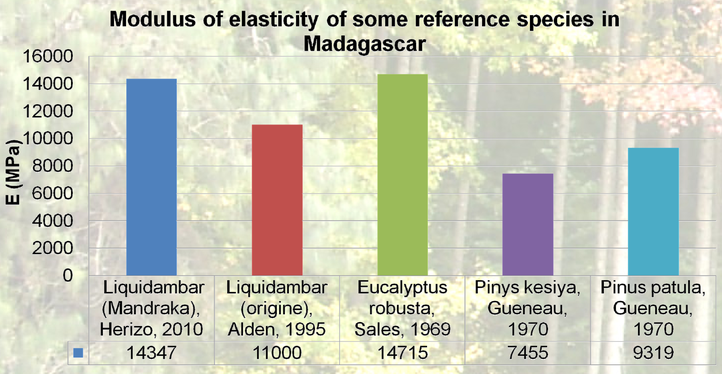
Three hypotheses were tested: (i) *Liquidambar styraciflua* woods are interesting for use in Madagascar and equivalent to local commercial woods, (ii) wood properties of trees are under strong genetic control, (iii) using diameter at breast height (DBH) as a selection trait improves wood quality as well.



MATERIALS AND METHODS

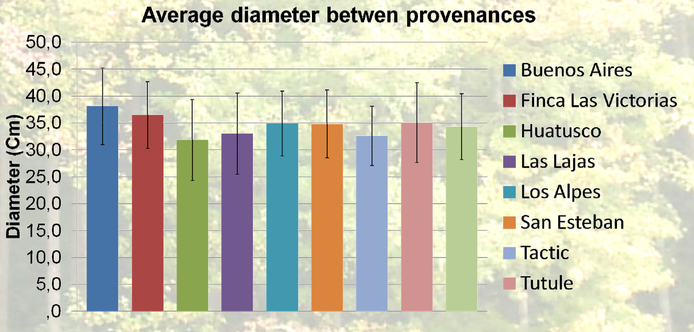
The provenance trial consists of 853 *Liquidambar styraciflua* trees from 13 provenances. For this study, 28 individual trees belonging to 9 provenances were selected. Specimens were collected at breast height. Wood properties included in the analysis were the modulus of elasticity (E), shear modulus (G) and wood density (D).

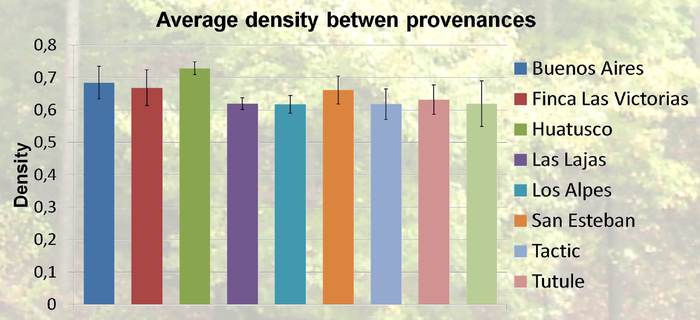
RESULTS



Liquidambar styraciflua properties were close to *Eucalyptus robusta* that are widely used in Madagascar.

There was significant variation in all wood properties due to provenances. According to the wood properties and dendrometric characteristics, the three best provenances were: Finca Las Victorias, Buenos Aires and San Esteban.





Properties	Mean	Coefficient of variation (CV)	Heritability (h^2_G)
Diameter at 1,30 m (22 years)	33,6 cm	20,22	0,77
Tree height (13 years)	19,1 m	21,13	0,90
Density (23 years)	0,65	8,9	0,71
Modulus of elasticity (23 years)	14 347 MPa	21,46	0,53
Shear modulus (23 years)	963 MPa	22,98	0,55

Diameter at 1,30 m (DBH), total height and wood density were found to be under high genetic control. Heritability of mechanical properties was moderate. DBH showed a significant correlation with wood density but not with mechanical properties.

CONCLUSION

Results indicated that the wood properties *of Liquidambar styraciflua* from Mandraka were adequate for structural and furniture uses in Madagascar. Work is continuing on the analysis of more properties like natural durability and chemical composition. DBH could be used in future selection and tree breeding programs to improve tree growth and wood density.

Aknowledgement

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